What is claimed is:

1. A method of manufacturing a semiconductor device comprising:

preparing a semiconductor substrate in which a silicon film is piled via a buried oxide film;

forming a first insulation film on the above silicon film;

providing an opening in the above first insulation film to expose a part of the above silicon film;

forming on an inner wall of the above opening a second insulation film whose etching selection ratio is different from that of the above first insulation film;

carrying out an oxidation process for a surface of the above silicon film exposed from the above opening portion provided on the inner wall thereof with the above second insulation film to thin the above silicon film;

forming a conductive film so as to fill in the above opening; and

eliminating the above first insulation film to form a gate electrode having the above conductive film and the above second insulation film formed on a side wall of the above conductive film.

2. The method of manufacturing a semiconductor device as in Claim 1, wherein the above first insulation film has an etching selection ratio in which the etching speed is faster than that of the second insulation film.

3. The method of manufacturing a semiconductor device as in Claim 1, wherein the above first insulation film is a silicon oxide film.

4. The method of manufacturing a semiconductor device as in Claim 1, wherein the above second insulation film is a silicon nitride film.

5. The method of manufacturing a semiconductor device as in Claim 1, wherein the above step of thinning the above silicon film is achieved by eliminating a silicon oxide film formed in the above oxidation process carried out for a surface of the above silicon film exposed from the above opening.

6. The method of manufacturing a semiconductor device as in Claim 1, further comprising implanting impurities in the above silicon film with the above gate electrode used as a mask to form a diffusion layer on the above silicon film, and thereby, form a MOSFET on a surface of the above silicon film.

7. The method of manufacturing a semiconductor device as in Claim 6, wherein the above MOSFET is of a fully depletion type.

8. The method of manufacturing a semiconductor device as in Claim 6, wherein, in the above step of thinning the silicon film, the thickness of the above silicon film becomes thinner in a region in which the above gate electrode is formed than in a region in which the above diffusion layer is formed.

9. A method of manufacturing a semiconductor device comprising:

preparing a semiconductor substrate in which a silicon film is piled via a buried oxide film;

forming a first insulation film on the above silicon film;

providing an opening in the above first insulation film to expose a part of the above silicon film;

forming on an inner wall of the above opening a second insulation film whose etching selection ratio is different from that of the above first insulation film;

carrying out an oxidation process for a surface of the above silicon film exposed from the above opening provided on the inner wall thereof with the above second insulation film to thin the above silicon film;

eliminating the silicon oxide film formed in the above opening in the above oxidation process;

forming a third insulation film on the silicon film exposed from the above opening after eliminating the above silicon oxide film formed in the above opening;

forming on the above third insulation film in the above opening a conductive film so as to fill in the above opening;

eliminating the above first insulation film while remaining the above second and third insulation films formed on the inner wall of the above opening and the above conductive film; and

implanting impurities in the above silicon film with the above gate electrode used as a mask to form a diffusion layer in the above silicon film, and thereby, form a MOSFET on a surface of the above silicon film.

10. The method of manufacturing a semiconductor device as in Claim 9, wherein the above first insulation film has an etching selection ratio in which the etching speed is faster than that of the second insulation film.

11. The method of manufacturing a semiconductor device as in Claim 9, wherein the above first insulation film is a silicon oxide film.

12. The method of manufacturing a semiconductor device as in Claim 9, wherein the above second insulation film is a silicon nitride film.

13. The method of manufacturing a semiconductor device as in Claim 9, wherein the above MOSFET is of a fully depletion type.

14. The method of manufacturing a semiconductor device as in Claim 9, wherein the above step of forming the third insulation film is carried out by means of a thermal oxidation method.

15. The method of manufacturing a semiconductor device as in Claim 9, wherein, in the above step of thinning the silicon film, the thickness of the above silicon film becomes thinner in a region on the top of which the above conductive layer is formed than in a region in which the above diffusion layer is formed.